A.D. 1897. Aug. 11. No. 18,645.

MASTERS & *another's* Complete Specification.

1898

18,645

Fermenting

184

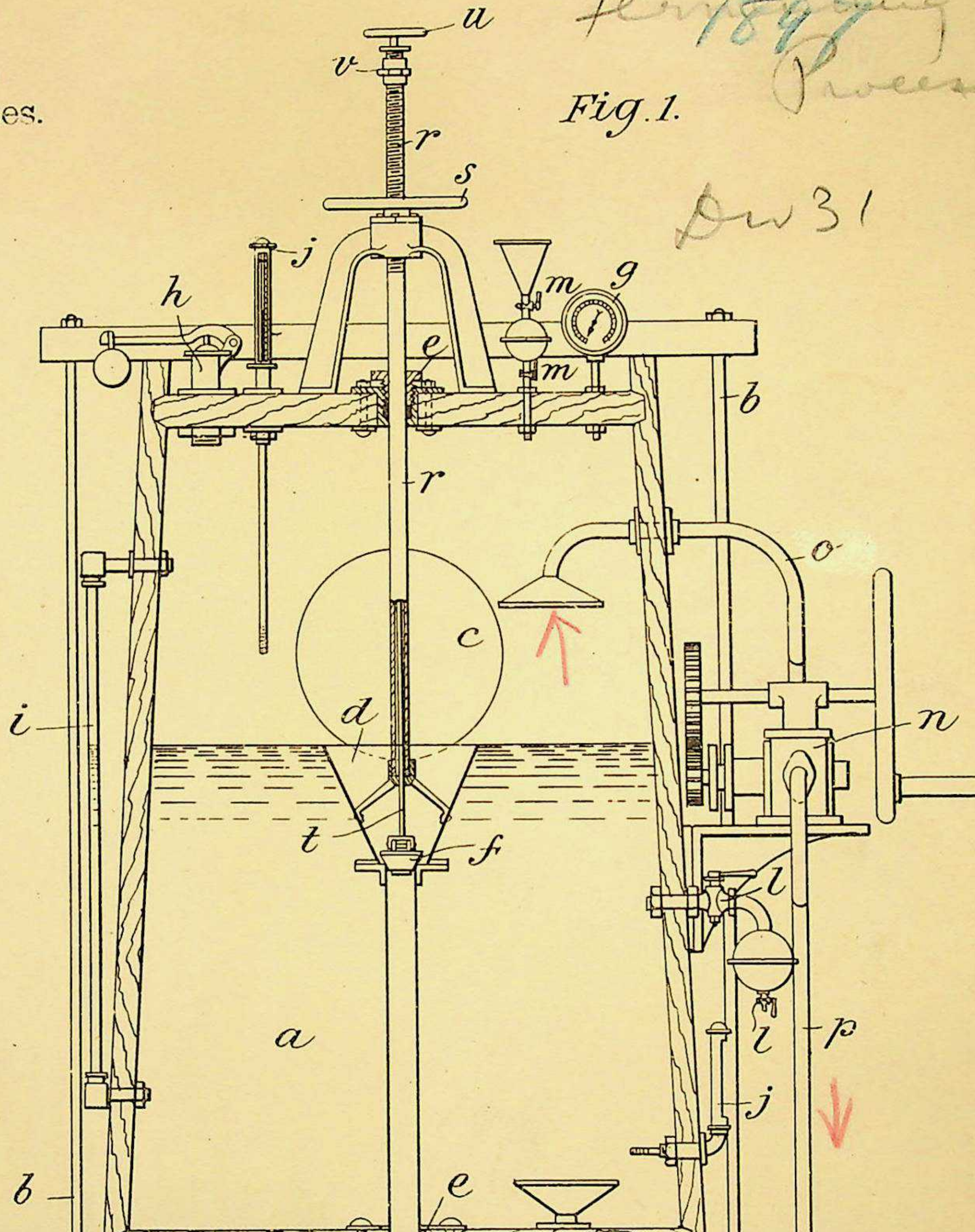
Process

~~193.~~ ALCOHOL:
Fermenting-
Processes.

~~20~~
33

Dw 31

Fig. 1.



195/20

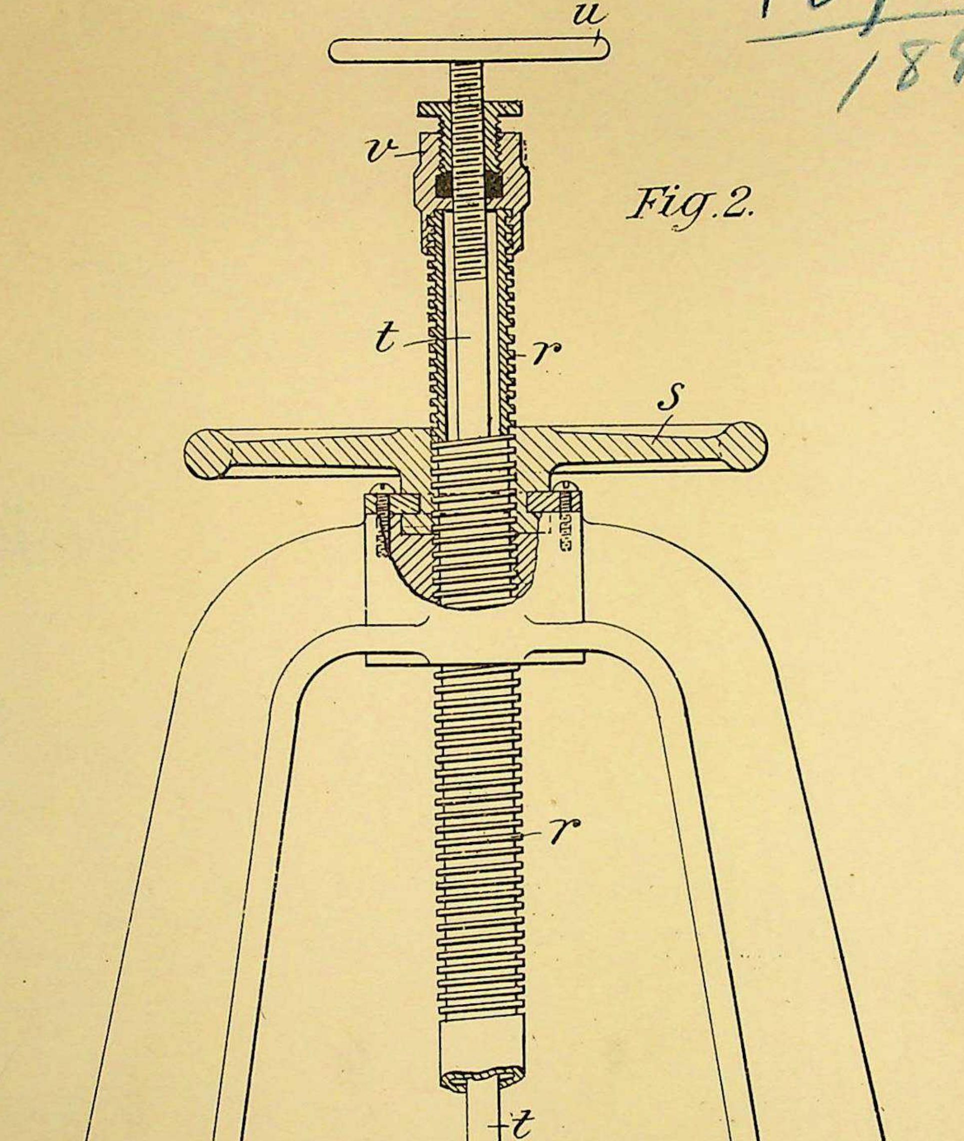
(1 SHEET)

1898

195. ALCOHOL,
Fermenting
Processes.

18,645
1897

Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]

18,645. 07/1897

AND BEVERAGES

426/14

85 + 86 1864-1898 ①
1897

RECORDED

Fermenting Process

99/44

N° 18,645 A.D. 1897

Date of Application, 11th Aug., 1897

Complete Specification Left, 11th May, 1898—Accepted, 25th June, 1898

DUPLICATE

PROVISIONAL SPECIFICATION.

Improvements in the Manufacture of Beer and other Alcoholic Liquors, and in Apparatus therefor.

We, Frederick Spencer Masters, of 573, Seven Sisters Road, South Tottenham, in the County of Middlesex, Brewer, and James Charles Shears, of 7, Uxbridge Road, Surbiton, in the County of Surrey, Engineer, do hereby declare the nature of this invention to be as follows:—

This invention relates to the fermentation of liquids for use in brewing, distilling and the like.

The invention consists essentially in carrying on the fermentation process in closed vessels under pressure and also in apparatus therefor.

Heretofore wort or saccharine liquid has ordinarily been fermented in open vessels to allow the carbonic acid gas to escape as quickly as it generates and when closed vessels have been used the carbonic acid gas has been removed by a pump and afterwards condensed.

According to our invention we ferment wort or saccharine liquids under pressure due to the carbonic acid gas which it evolves and we thoroughly impregnate it with the gas. By applying our invention to the brewing of beer we produce good sound brilliant beer of exhilarating and pungent nature containing all the natural hop aroma and of superior keeping qualities to beer fermented in the atmosphere and light; beer brewed according to this invention has the appearance and taste of beer of much higher gravity free from deposit, and it can be racked direct from the fermenting tun into carriage casks with less hopping down than is required in the case of ordinary beer, so that no settling back is required and producing a sound pitching yeast which will not require pressing.

By this process all classes of beer and alcoholic fermentations can be effected in one vessel by skimming or cleansing as desired.

For this purpose we construct the fermenting vessels of wood or metal of suitable closed form to withstand the gas pressure. The fermenting vessel should be provided with a pump so arranged that the gas be drawn by it from the upper part of the vessel and forced through the wort contained in it.

We may provide the closed fermenting vessels with skimming parachutes and valves with raising and lowering gear to be worked from the outside, also powerful attemperators. Manholes, pressure gauges, safety valves, content gauges, thermometers, racking, sampling and drain cock or valves should also be provided and of sufficient strength to stand the pressure.

Dated this 11th day of August 1897.

J. C. MEWBURN & ELLIS,
55 and 56, Chancery Lane, London, Chartered Patent Agents.

[*Price* 8*d*.]

COMPLETE SPECIFICATION.

Improvements in the Manufacture of Beer and other Alcoholic Liquors, and in Apparatus therefor.

We, Frederick Spencer Masters, of 13, Carlton Road, Phillip Lane, Tottenham, in the County of Middlesex, (formerly of 573, Seven Sisters Road, South Tottenham), Brewer, and James Charles Shears, of 7, Uxbridge Road, Surbiton, in the County of Surrey, Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

The objects of this invention are to produce beer or other alcoholic liquor of superior quality to that resulting from the ordinary process of fermentation as regard its clearness or brilliancy, its exhilarating and pungent nature, its keeping properties and its roundness, softness or fulness of palate and its freedom from deposit and at the same time to lessen the cost of manufacture.

Heretofore wort or saccharine liquid has ordinarily been fermented in open vessels to allow the carbonic acid gas to escape as quickly as it generates and if closed vessels have been used the carbonic acid gas has been removed by a pump and afterwards condensed or stored.

We have discovered that by carrying on the fermentation process in closed vessels under a pressure of carbonic acid gas we are enabled to produce a rounder, softer and fuller beer than that fermented by ordinary methods and which has the appearance and taste of beer of much higher gravity and which has superior keeping qualities and produces absolutely pure yeast of superior form and strength.

Ordinary fermenting vessels require to be fitted with some form of attemperator to enable the wort or saccharine liquid to be kept down to the desired temperature by the circulation of water through the attemperator, or to be placed in a room in which the temperature can be controlled by artificial means such as refrigerating machinery, but we have discovered that as the carbonic acid gas evolved from the fermenting wort or saccharine liquid is colder than the wort that by keeping it under pressure in the fermenting vessel the temperature of the wort is sufficiently controlled by the coldness of the gas to enable the fermentation process to be carried through at a low temperature and maintained without the use of any other cooling medium.

We have further discovered that by drawing the gas from the top of the fermenting vessel by means of a pump and injecting it into the wort in the vessel, not only is the wort cooled sufficiently to enable the fermentation to be carried through at a low temperature but also the wort is caused to absorb the gas and become impregnated with it. This has also the effect of relieving the pressure and at the same time of subjecting the wort to a most efficient form of rousing which can only be beneficial to it.

The fermenting vessels may be made of any suitable material such as wood, metal or glass of any convenient closed form and stayed or not to resist the pressure of the gas; they should be provided with a suitable manhole and door and if required they can be covered with any suitable form of insulating or non-conducting material. They may be fitted with yeast skimming parachutes and valves of the special form hereinafter described or of other suitable form, raising and lowering gear to be worked from the outside, also with attemperators, pressure gauges, safety valves, content gauges, thermometers, racking, sampling and drain cocks or valves and a suitable form of pump for collecting and injecting the gas and for rousing the liquid during fermentation.

Wort or saccharine liquid can be fermented by this process in closed vessels by either of the systems known as the skimming or cleansing systems.

In practice it is found sometimes desirable to allow some of the gas to escape through the safety valve or to be drawn off by a pump to reduce the pressure.

In practice it is also found sometimes desirable to allow attenuation to proceed to its utmost limit before skimming.

The characteristic feature of the invention consists in fermenting saccharine liquids in closed vessels under the natural pressure of the carbonic acid gas evolved by them and using the gas for cooling and carbonating the fermented liquids.

The apparatus for carrying out this process may be modified in form and construction at will, and the temperature may be regulated and the length of operation varied according to the character of the product required.

The invention is not only applicable to the fermentation of wort or saccharine liquids for the manufacture of beer and the like but also to the fermentation of saccharine liquids for the production of vinegar.

In order that our invention and how it may readily be carried into effect may be fully understood we will proceed to describe the drawings hereunto annexed.

Figure 1 is a vertical section of a fermenting vessel suitable for the purpose of our invention. The vessel here represented is adapted for fermenting beer.

Figure 2 is an elevation partly sectional, showing on a larger scale than Figure 1 the upper part of the screw by which the parachute is raised and lowered and of the rod which carries the yeast valve.

a is the closed fermenting vessel, *b b* are stays to resist pressure, *c* represents a manhole and cover, *d* is a yeast skimming parachute which works through stuffing boxes, *e e* in top and bottom of vessel. *f* is the yeast valve, *g* is a pressure gauge, *h* safety valve, *i* contents gauge, *j j* thermometers, *k* racking cock, *l l* sampling cocks, *m m* cocks to return samples. *n* is a pump for drawing the gas from the upper part of the fermenting vessel *a* and injecting it into the wort in the vessel. *o* is the suction pipe to the pump *n* and *p* the delivery pipe from the pump. *r* is the screw by means of which the parachute is raised and lowered and *s* is a hand wheel for turning the screw. Instead of the screw *r* being a solid screw as usual, it is an externally threaded tube or hollow rod so that the yeast valve rod can work through it. *t* is the yeast valve rod passing through the hollow screw *r*; its upper end is screw threaded and is fitted with a hand-wheel *u*; it works through a stuffing box *v*.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. The fermenting of wort or saccharine liquids in closed vessels under pressure of the carbonic acid gas evolved by them, as set forth.

2. In the fermenting of wort or saccharine liquids, the cooling and carbonating of the same by the carbonic acid gas evolved therefrom in closed vessels, as set forth.

3. The method or process of fermenting wort or saccharine liquids which consists in fermenting the liquids in closed vessels, drawing from the upper part of such vessels the carbonic acid gas evolved by the said liquids, and injecting this gas into the liquid in the vessel, as set forth.

4. The construction of the parachute rod in the form of an externally threaded tube and fitting the yeast valve on the end of a rod which passes through the said tube the whole being arranged so that they can be raised and lowered from the outside of the fermenting vessel substantially as set forth.

5. The combination of parts substantially as hereinbefore described and shown

in the drawings constituting an improved apparatus for the manufacture of beer and other alcoholic liquids.

Dated this 9th day of May 1898.

J. C. MEWBURN & ELLIS,
55 and 56, Chancery Lane, London, Chartered Patent Agents.

Redhill : Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1898